BNL Contributions to DUNE

BNL contributes to most aspects of DUNE

- Originated many of the core ideas that led to DUNE.
- Contributing key technologies and overall detector design.
- Providing leadership in areas of Physics, computing, hardware, engineering, project management and collaboration organization.
- Developing the Cold Electronics including fabrication and testing.
- Developing advanced simulation, noise abatement, critical signal processing and cutting edge LArTPC reconstruction techniques.
- Contributing to near detector and neutrino beamline design and understanding of systematics.

Major DUNE Software & Computing Activities at BNL

- **Wire Cell software development**: LArTPC signal and noise simulation, excess noise filtering, signal processing, 3D activity imaging, pattern recognition and event reconstruction.
- **protoDUNE Prompt Processing System** for data quality monitoring. Runs DQM jobs in a pilot-based workflow management system with a novel fixed deadline strategy, manages data and visualizes results produced immediately after data acquisition.
- **Cold Electronics Testing**: for protoDUNE and SBND cryogenic temperature front-end amplifier and ADC ASICs (developed by BNL). Computing includes acquisition, analysis, management and curation of $\sim$50 TB quality control and calibration data.
- **Software Release Management** for DUNE offline software packages.

DUNE Computing Needs from BNL

Next few years (protoDUNE)

- Data curation of Cold Electronics QC data (eg, RACF BNLBox) for lifetime of protoDUNE experiment.
- Small/moderate-scale simulation and data processing on RACF nodes in support of Wire Cell development.

Next ten years (DUNE)

- Modest scaling up DUNE nodes in RACF to support BNL efforts.
- Possible, additional scaling-up for:
  - Participation in DUNE production processing.
  - DUNE data storage and distribution.
  - Effort to understand how best to align BNL computing capabilities with DUNE is ongoing.